East Waterway Feasibility Study

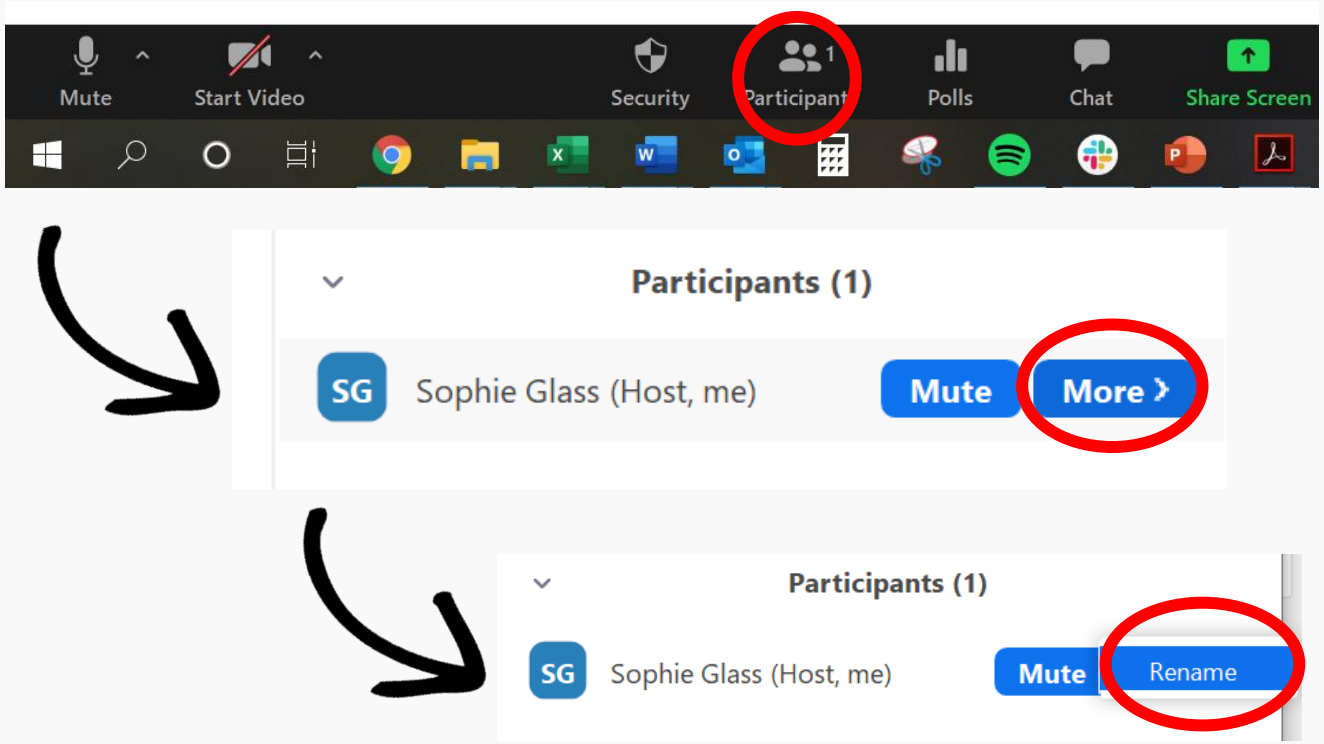
Community Meeting

December 7, 2021

5:30 PM to 7:15 PM

This meeting will be recorded

Meeting Set-Up

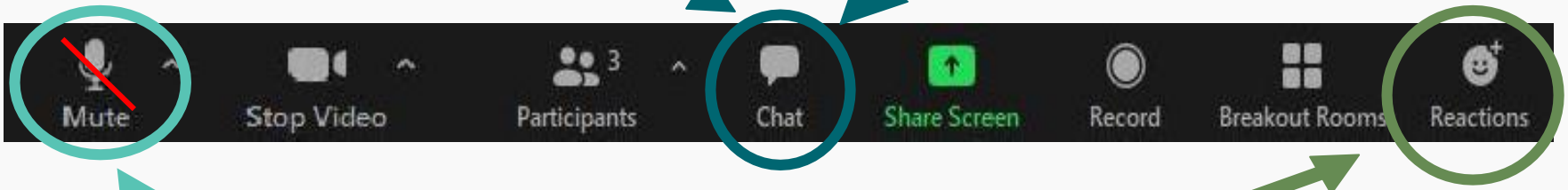


Change your "participant name" to your name and the organization you represent (if representing a group other than yourself).

Meeting Set-Up

If you **want to type a question regarding the presentation,** insert **"Slide X followed by your question"** in the chat box

If you **have a technical issue** please send a message to Dat Nguyen or call 206-778-6485.



Please **keep yourself on mute** unless you are speaking.

If you want to **ask a question verbally,** click the 'Reaction' button and click on the **'Raise Hand'** option and we will call on you.

Welcome and Ground Rules

1. Ask questions using the chat or hold verbal questions until after each speaker
2. Be respectful of each other
3. Speak slowly and take pauses after 2-3 sentences for interpreters

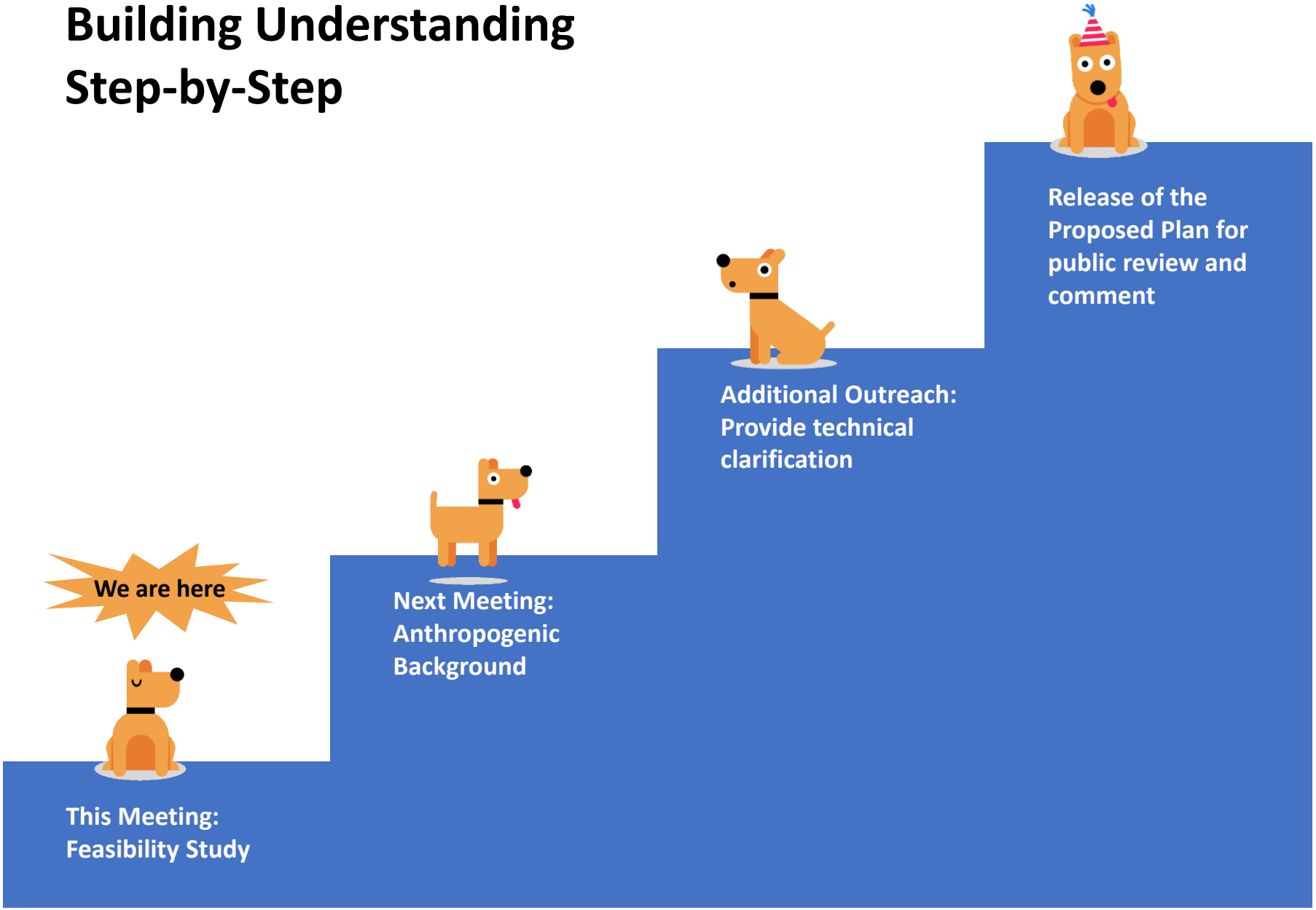
Meeting Objectives

1. Continue outreach and engagement for the Superfund process at the East Waterway.

2. Build understanding about the scientific work that went into the remedial investigation and feasibility study so that the community can meaningfully participate in the review and comment on the Proposed Plan.

3. Explain the 2019 Feasibility Study for the East Waterway.

Building Understanding Step-by-Step



East Waterway Operable Unit

Feasibility Study

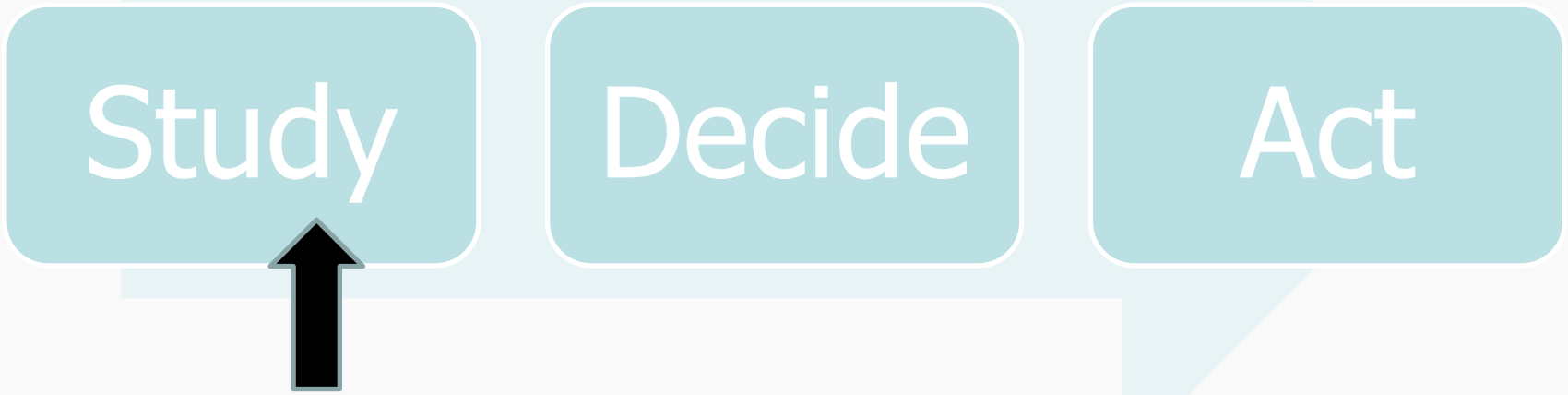
HARBOR ISLAND SUPERFUND SITE, SEATTLE, WASHINGTON

RAVI SANGA, RPM

Some ways we can engage with you during the Superfund process

- Workshop for community members interested in forming a CAG and offer TASC assistance
- Presentation on the Superfund process
- Workshop on how to provide useful comments to EPA
- Presentation on the Feasibility Study (today)
- Webinar on the Anthropogenic Background memo and the physical processes in the Duwamish system (Green River vs LDW vs East Waterway)
- Webinar on the difference between Remedial Action Level and cleanup level

Cleanup Process



This meeting:
EPA is explaining
Feasibility Study

Technical Assistance Services for Communities (TASC)

The TASC program benefits people in the community by:

- Helping them understand complex environmental issues.
- Explaining technical information and answering questions.

Some types of services TASC can provide:

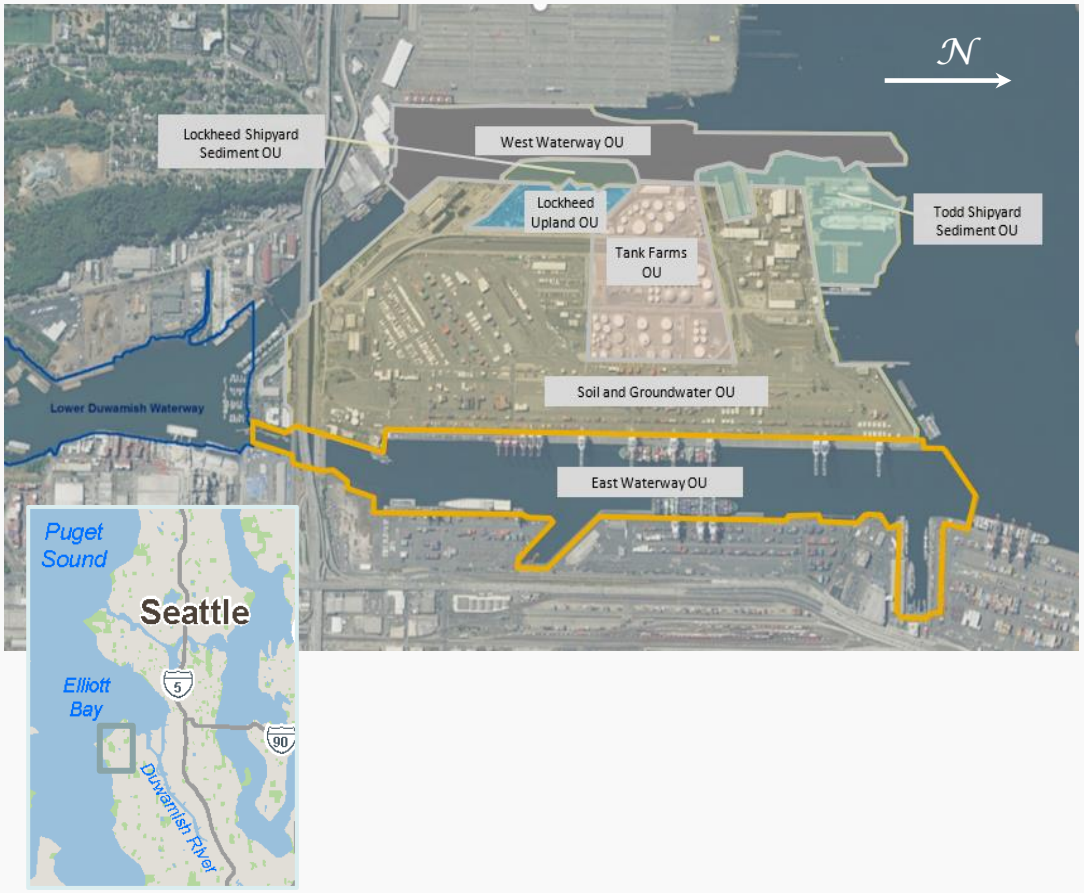
- Technical assistance needs assessments.
- Reviewing and explaining technical information.
- Helping communities form Community Advisory Groups.
- Supporting your active role in protecting healthy communities and advancing environmental protection.

Currently Available to the LDW Community

For more information or to request services

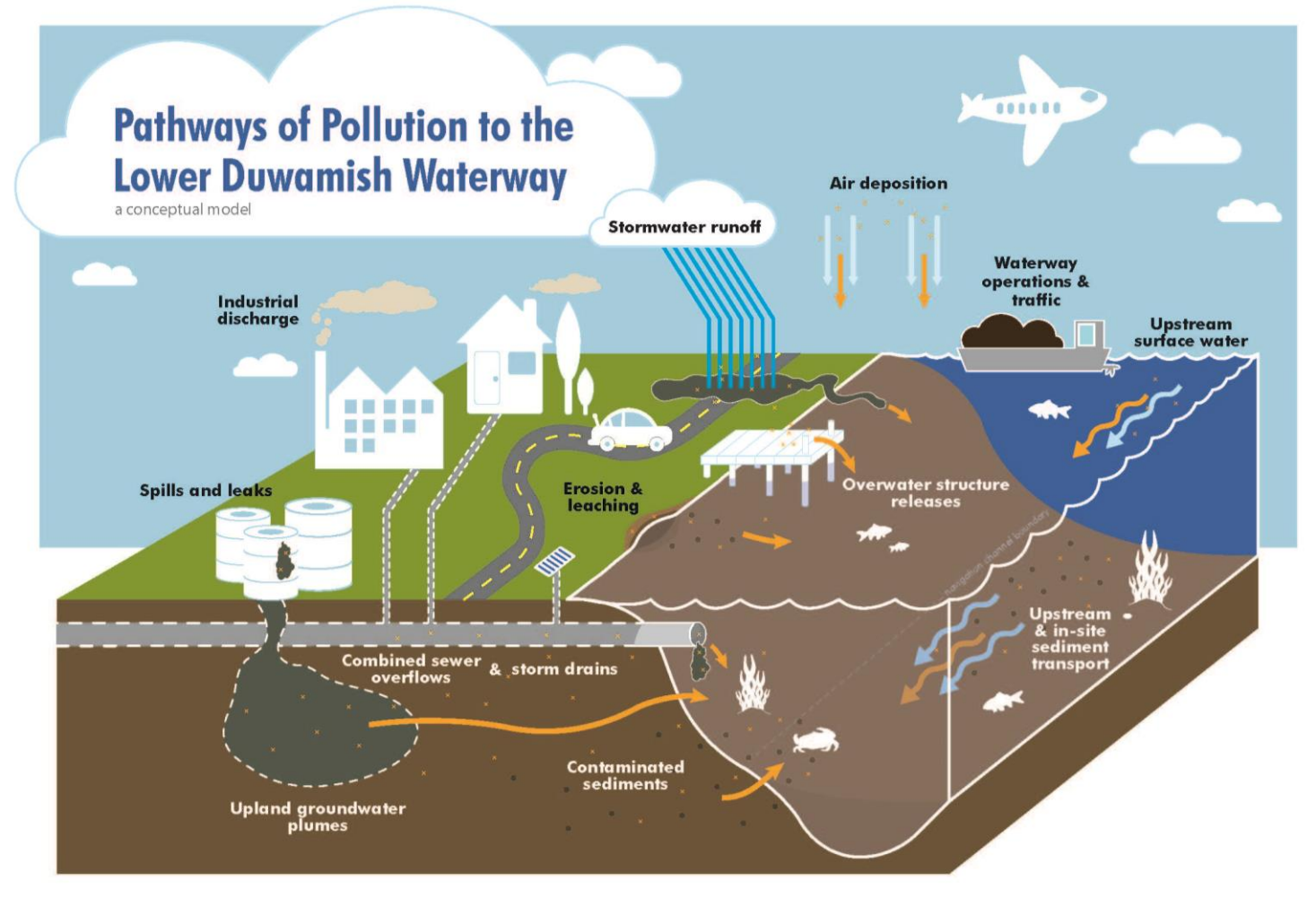
contact Kay Morrison 206-553-8321

Site History



- East Waterway is part of the Harbor Island Superfund Site.
- Active port with commercial and industrial uses;
- Supports tribal, subsistence, and recreational fishing.
- Downstream of the Lower Duwamish Superfund Site.
- 157-acre site located at the confluence of Duwamish River and Elliott Bay.

Where does the pollution come from?



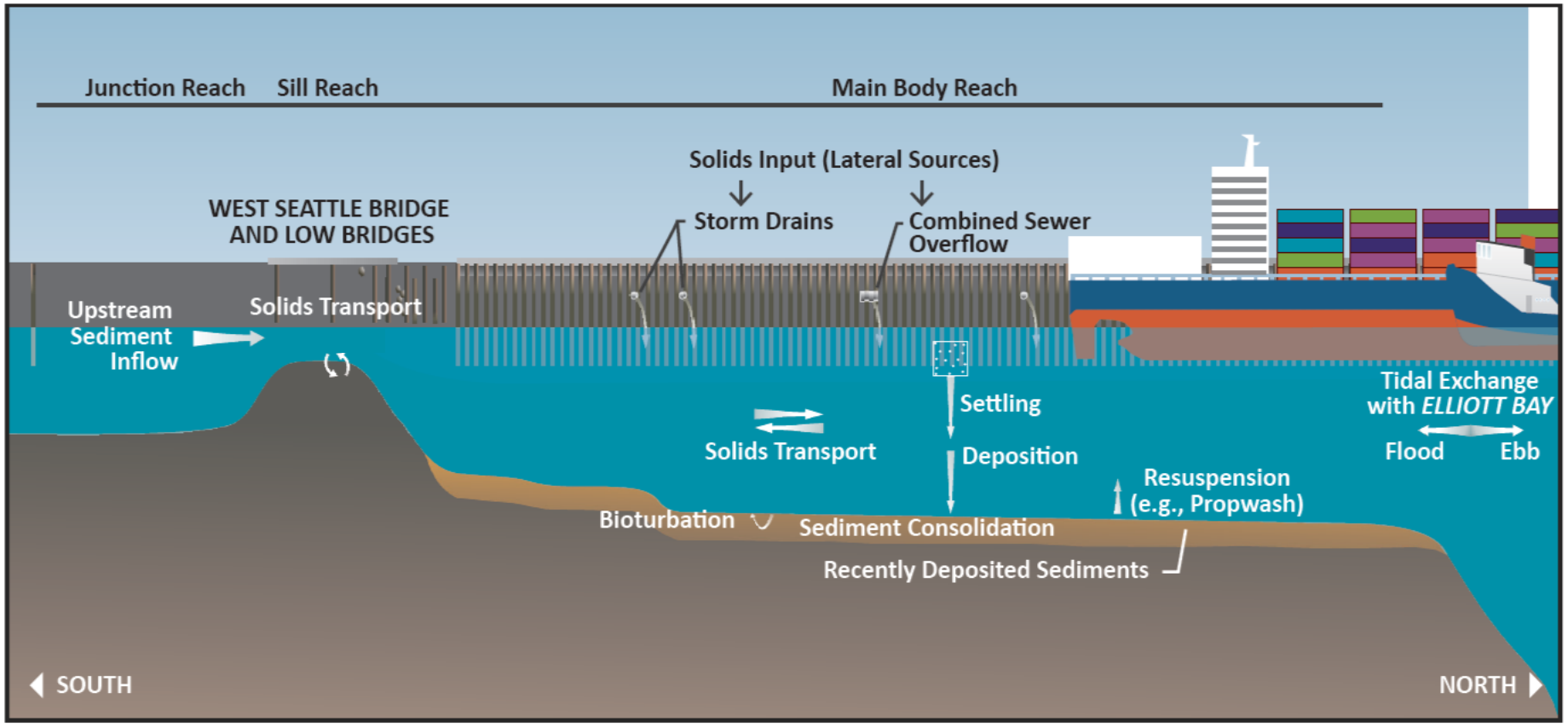
Remedial Investigation

- Contaminants at East Waterway include PCBs, arsenic, PAHs, dioxins/furans, mercury, and tributyltin.
- Average depth of contamination is 3 feet; and up to 15 feet in some locations.
- Risk Assessment
  - Human health risk assessment indicated that the highest risks to people are from eating resident fish and shellfish.
  - Contaminant concentrations pose unacceptable risk to wildlife.

The Remedial Action Objectives for the East Waterway are what the proposed cleanup will achieve.

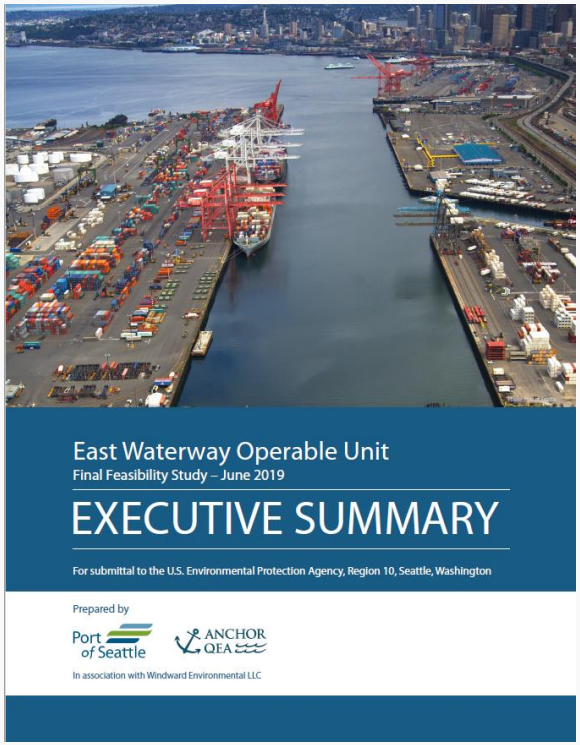
- Protection of human health via seafood consumption and direct contact with sediment during netfishing and clamming.
- Protection of ecological receptors such as the benthic community, fish and shellfish.

Conceptual Site Model



Feasibility Study – completed 2019

- The Feasibility develops and evaluates cleanup options
- What areas of the Site require remediation to meet cleanup goals?
- What technologies can be used to cleanup the site?
- Develop alternatives with different combinations of technologies.
- Evaluate the alternatives using the Criteria defined in the National Contingency Plan (NCP)



CERCLA Evaluation Criteria

- Threshold Criteria
  1. Overall protection of human health and the environment
  2. Compliance with applicable or relevant and appropriate requirements
- Balancing Criteria
  3. Long-term effectiveness and permanence
  4. Reduction of toxicity, mobility, or volume through treatment
  5. Short-term effectiveness
  6. Implementability
  7. Cost
- Modifying Criteria
  8. & 9. Tribal, State, and Community Acceptance (evaluated after formal comment on the Proposed Plan)

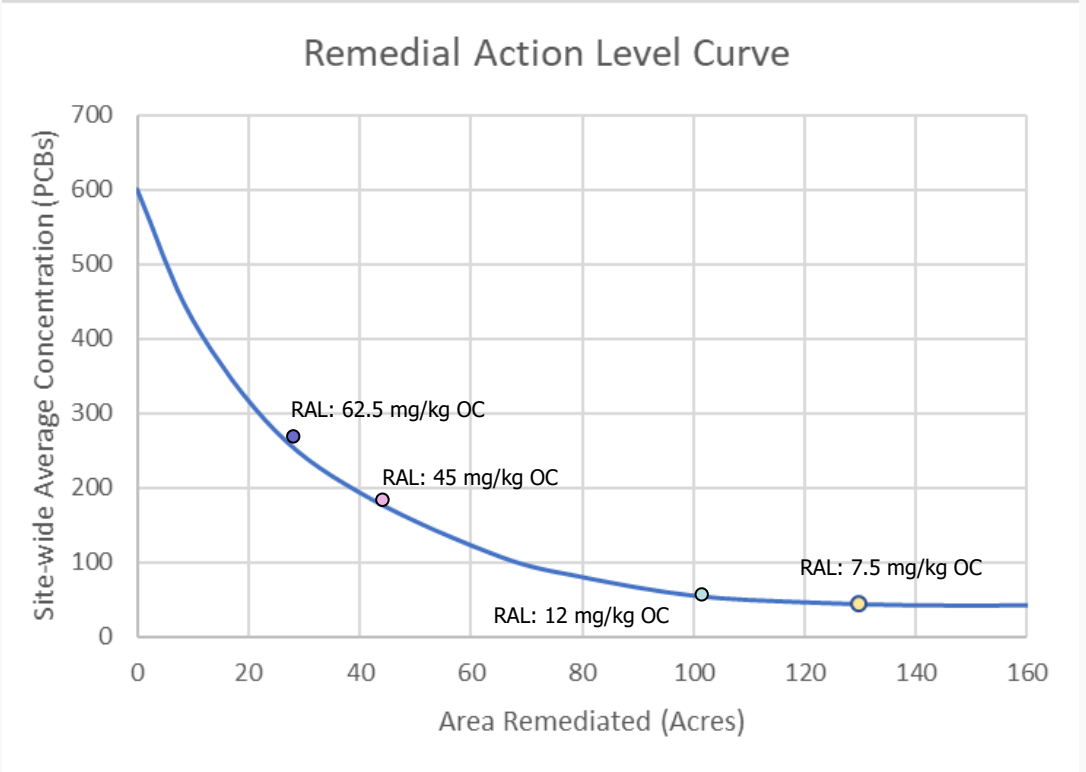
Remedial Action Levels

- Similar to the Lower Duwamish Waterway Superfund Site, Remedial Action Levels were used to determine those areas where some type of active remediation is needed.
- Remedial action levels (RALs) are concentrations of key chemicals that:
  - Define the areas and depths of sediment that require remedial action.
  - Will result in the cleanup achieving the remedial action objectives.

Contaminants of Concern	RAL	
Total PCBs	12 mg/kg OC	192 µg/kg dw
	7.5 mg/kg OC	120 µg/kg dw
Arsenic	57	mg/kg dw
Dioxins/furans	25	ng TEQ/kg dw
Tributyltin	7.5	mg/kg OC

Remedial Action Levels

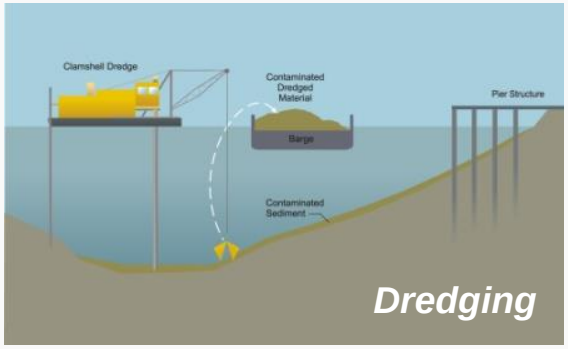
- RALs were developed by selecting a series of contaminant concentrations and looking at size of the cleanup area and the resulting concentration immediately after cleanup.
- As RAL concentrations get lower, the cleanup area increases and the resulting sediment concentration in the waterway decreases.
- At low RAL concentrations, the benefits additional active remediation decrease.
- At this point, monitored natural recovery is used to achieve cleanup goals.



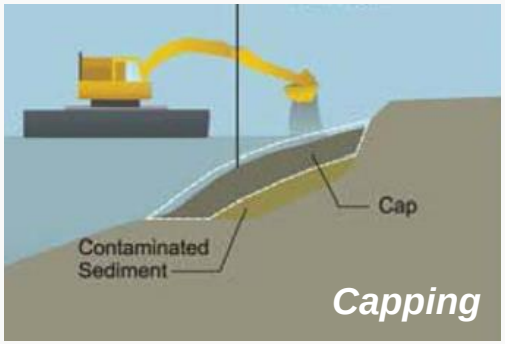
Cleanup Technologies

- *All alternatives are different combinations of these technologies*

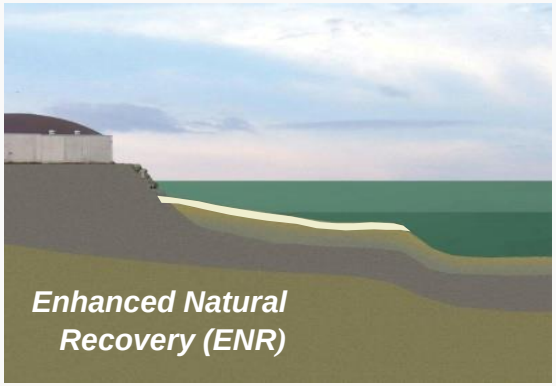
Active Technologies



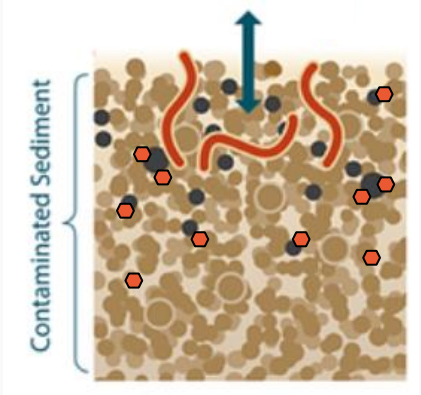
Removal/Dredging



Containment

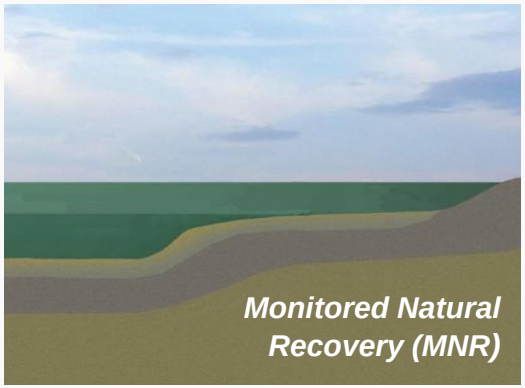


Enhanced Natural Recovery



In Situ Treatment

Passive Technology



Monitored Natural Recovery

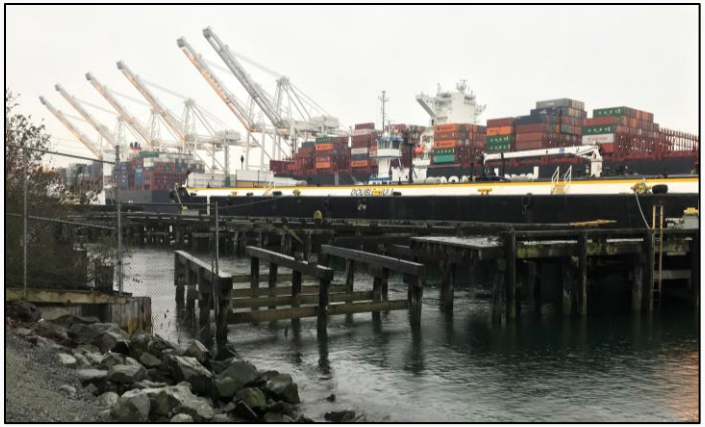
East Waterway Alternatives

- **Open-water areas**
  - Dredging (removal) of sediment above the RAL.
  - Capping – isolating contaminated sediment under an engineered armored cap.
  - Enhanced natural recovery (ENR) – a thin layer of sand that mixes into the surface sediment and reduces the contaminant concentrations.
- **Limited Access Areas**
  - Technologies limited to treating sediment in place or specialized removal (diver-assisted).
- **Monitored Natural Recovery is included in all alternatives**
  - Surface sediment concentrations decrease by new sediment settling over the current sediment surface – good for areas with low concentrations.

East Waterway Alternatives

Open Water

Limited Access



East Waterway Alternatives

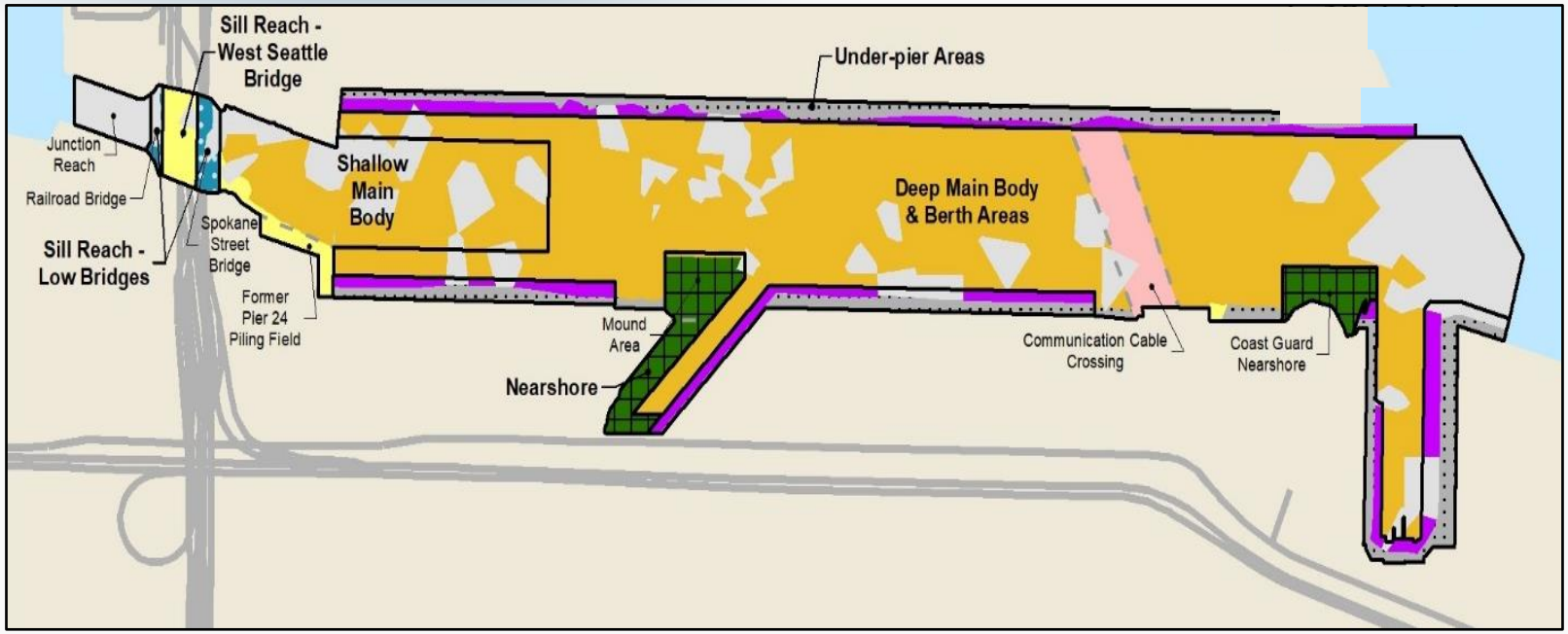
- Alternatives would attain a sediment concentration for PCBs of approximately 45 µg/kg dw after active cleanup was complete
- The pre-cleanup concentration is 460 µg/kg dw total PCBs
- The alternatives actively address 70% to 84% of the entire waterway.

Technology	Area (acres)
Total Active Cleanup	**108 - 132**
Dredging	77 - 124
Partial Dredge and Capping	7 - 13
Enhanced Natural Recovery	1 - 19
Monitored Natural Recovery	**25 - 49**

East Waterway Alternatives

Alternative	Summary of Alternative				Volume Removed (CY)	Estimated Cost
	Open Water Areas	Limited Access Area	West Seattle Bridge	PCB RAL		
No Action	Monitoring only				0	$950,000
1A(12)	Dredging, capping, enhanced natural recovery (ENR)	Monitored Natural Recovery	Enhanced Natural Recovery (ENR)	12 mg/kg OC (192 µg/kg dw)	810,000	$256 M
1B(12)		In-situ treatment			810,000	$264 M
1C+(12)		Selective diver dredging combined with in-situ treatment			820,000	$277 M
2B(12)	Dredging, limited capping	In-situ treatment			900,000	$284 M
2C+(12)		Selective diver dredging combined with in-situ treatment			910,000	$297 M
3B(12)	Maximize dredging	In-situ treatment	Removal		960,000	$298 M
3C+(12)		Selective diver dredging combined with in-situ treatment			960,000	$310 M
2C+(7.5)	Dredging, limited capping		ENR	7.5mg/kg OC (120 µg/kg dw)	1,010,000	$326 M
3E(7.5)	Maximize dredging	Diver dredging	Removal		1,080,000	$411 M

Example of Alternatives

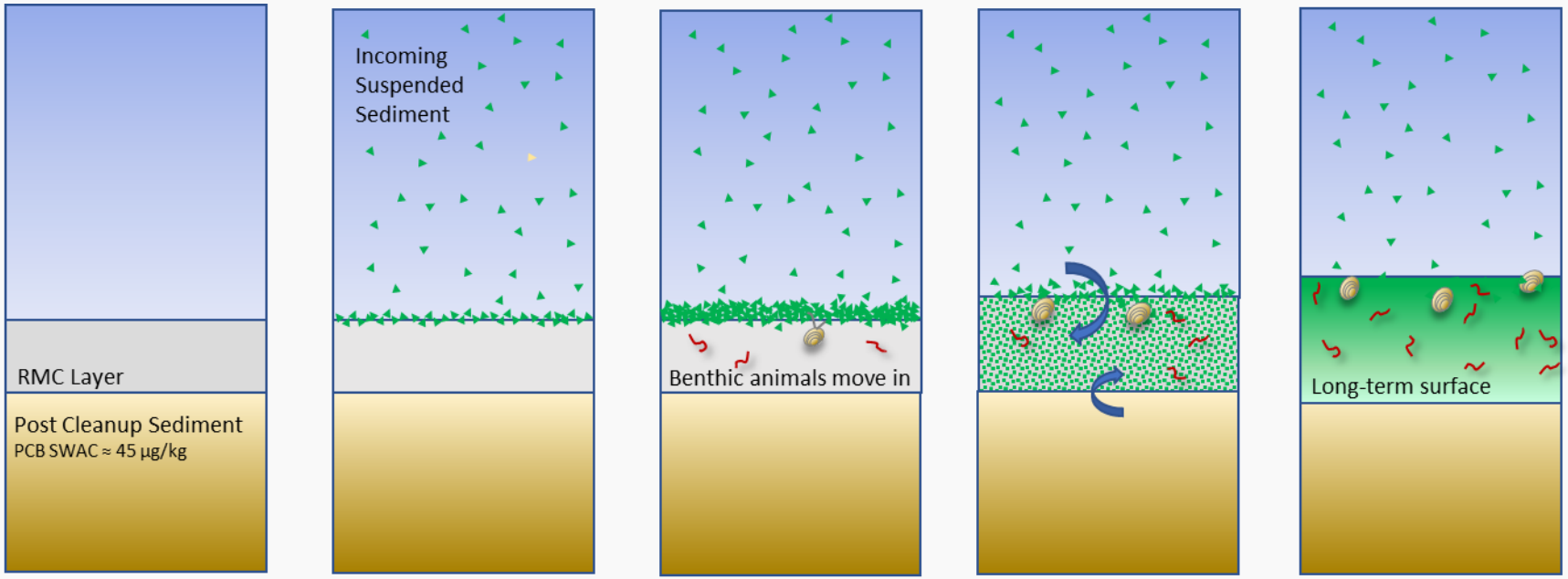


Legend

- Removal
- Removal to the Extent Practicable; Backfill
- Removal; Backfill to Existing Contours
- Capping with Partial Removal
- ENR-nav
- ENR-nav with Partial Removal
- ENR-sill
- MNR Under-pier
- Diver-Assisted Dredging; In Situ Treatment
- In Situ Treatment
- MNR
- Riprap

After Active Cleanup

- Following active cleanup, the long-term concentration at the sediment surface is determined by upstream sediment mixing with the post-cleanup sediment.



Monitoring after Active Cleanup

- After the active cleanup, monitoring is required to ensure construction is complete and to monitor the effectiveness of cleanup.
- Monitoring will include:
  - Sampling of the sediment surface in open water areas
  - Sediment porewater concentrations of PCBs in limited access areas
  - Surface water
  - Tissue levels in fish and invertebrates (for example, crab)
- Monitoring of incoming suspended sediment concentrations.

Early Actions

- Early actions help to reduce contaminant concentrations prior to the waterway cleanup action
- Two Early Actions in East Waterway
  - US. Coast Guard, Slip 36
  - Port of Seattle, Terminal 25

Slip 36

Terminal 25

Comparison of Cleanup Activities

	East Waterway Feasibility Study	Lower Duwamish Record of Decision
Area	157 acres	441 acres
Area with Active Cleanup	108 – 132 acres (69% to 84%)	206 acres (47%)
Remedial Action Level for PCBs	12 mg/kg OC 7.5 mg/kg OC	12 mg/kg OC
PCB SWAC prior to Cleanup	460	346
PCB SWAC after Active Cleanup	Approximately 45	Approximately 60
Other RALs	RAL values are similar	

Questions